

ABSTRACT OF THE DISCLOSURE

A direct expansion geothermal heat exchange system including certain line set sizes, distances, designs, depths, and lengths, including a long trench system design, certain vapor line coverings and moisturizing means, certain refrigerant operational pressures and type, certain pin restrictor sizes and locations, certain liquid line insulation lengths, certain containment pipe composition, pipe sizing with polyethylene, pipe antifreeze fill percentage, and pipe top sealing, a certain oil return safeguard procedure, certain interior heat exchanger design tonnages with predominate heating loads and with predominate cooling loads, a certain receiver type and capacity, an optional means of placing sub-surface refrigerant transport tubing within respective protective containment pipes, certain trench system and well/borehole system combinations, and certain trench creation means.